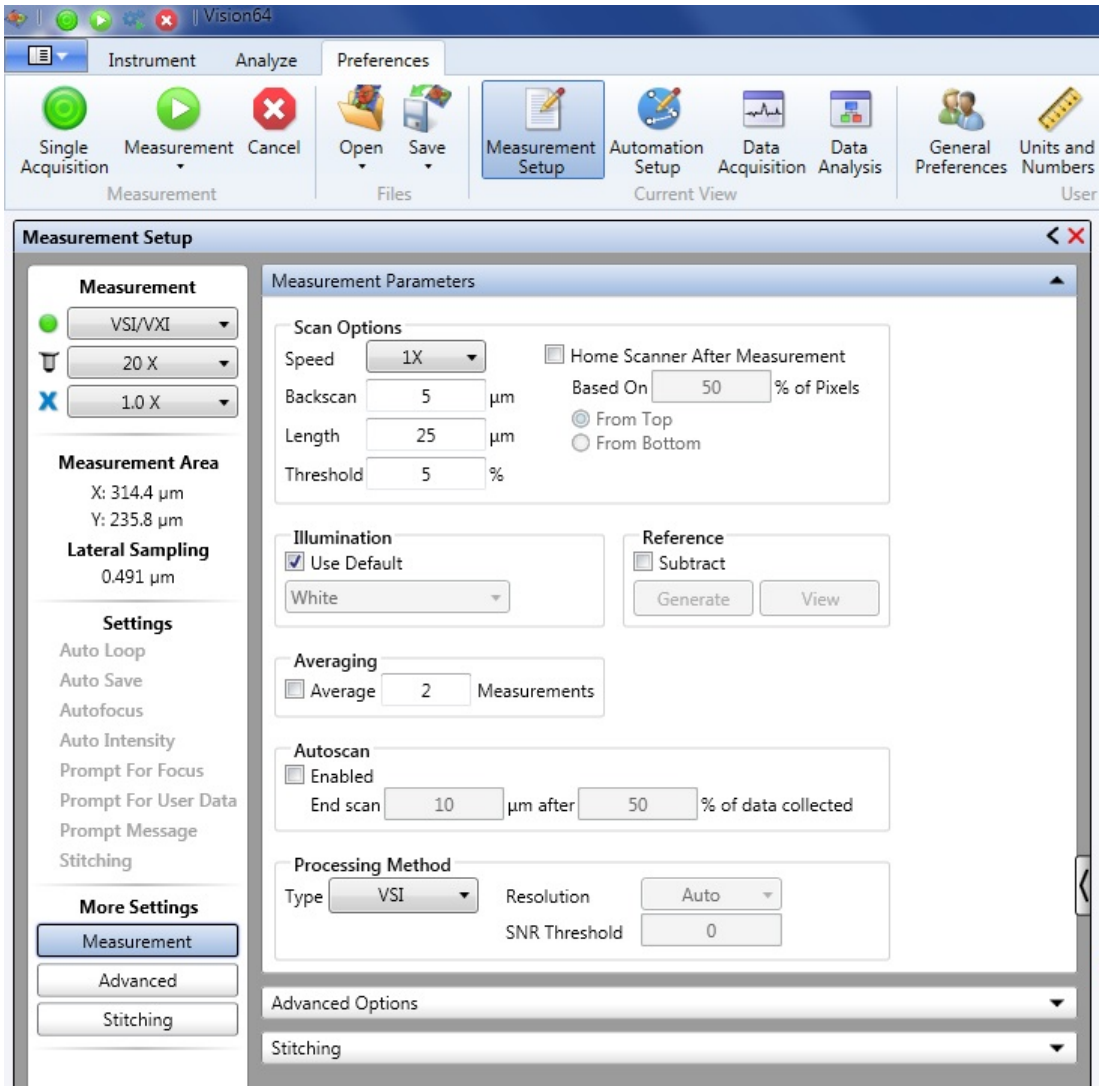
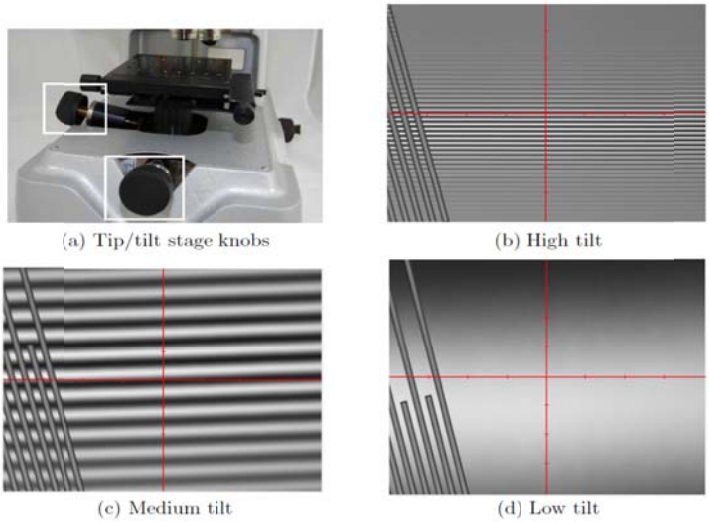
Brief Manual for 3D Optical Microscope

1. Log in FOM
2. Open the Vision64 program on the instrument computer.
3. Turn the objective lenses to start with the 5X magnification – **WARNING: DO NOT CHANGE THE OBJECTIVE LENSES BY GRABBING THE LENSES, USE THE TURRET WHEEL TO TURN THE LENSES.**
4. Adjust the Z-axis to raise the objective lenses, and place your sample on the stage.
5. While watching your sample, adjust the Z-axis to lower the objective lenses to within a ~5 mm of your sample – **WARNING: MAKE SURE TO WATCH YOUR SAMPLE WHILE LOWERING THE LENSES, TO AVOID CRASHING THE LENSES INTO THE STAGE.**
6. In the "Measurement Setup" window, select your measurement mode, PSI or VSI. PSI is typically used for very smooth surfaces, with features that are less than 160 nm. VSI is typically used to measure features between 160 nm and 10 mm.
7. Open Measurement Parameters window from More Settings – Measurement button



8. Scan Options – Speed is 1X; Backscan is 5um; Length should be greater than the surface roughness.

9. Press the **AUTO** button on the "Intensity" window, to automatically adjust the brightness of the sample (if there are red dots present on the screen, then the sample is over-saturated with light). Once the intensity is optimized, press the **AUTO** button again to turn this setting off.
10. Slowly adjust the Z-axis to bring your sample into focus till you can see the interference fringe.
11. Use the tilt knobs on the instrument to adjust the tilt and reduce the fringes present on the sample. First adjust the knob on the left side of the instrument, to make the fringes horizontal. Then adjust the knob on the center of the instrument to reduce the fringes. The Z-axis should also be adjusted during this process, to keep the sample in focus. (See below):



(a) Tip/tilt stage knobs (b) High tilt

(c) Medium tilt (d) Low tilt

12. Once the focus and tilt have been adjusted, the magnification can be increased (using the turret wheel to rotate the objective lenses). Make sure that the magnification selected in the "Measurement Setup" tab corresponds to the objective lens in use.
13. Click the **Measurement** button from the top panel to collect data.
14. In the Data Analysis window, select the "Terms Removal" option from the Analysis Toolbox in order to calibrate the data and perform tilt correction in the image. If the sample is completely flat, then you can select **Tilt Only (Plane Shift)** option by right clicking on "Terms Removal" and selecting "Edit Settings". If the sample is not flat, then you can select the **Tilt Only (Plane Shift)** option and also check the "Use Terms Mask" option. You can then click the "Edit Mask" button to select the area you want to use for the tilt correction.
15. In the Data Analysis window, you can select the "3D Plot" button on the left side of the screen to generate a 3D image of your sample. The scrolling wheel on the mouse allows you to zoom in or out, and you can also increase or decrease the magnification using the arrows on the right side of the window. The slider arrows on the x- and y-axes of the plot could be used to obtain 1D profiles of a selected region of the graph.
16. For a big area, you can use stitching function by Enable Stitching.
17. You can save the raw data in C:/USER-DATA/your folder with extension of OPDx. You also can export X and Y profile as CSV file.
18. Raise the objective lenses and remove your sample
19. Log off FOM